

Weekly Report

2016.12.19-2016.12.25

1.This Week

Security Project

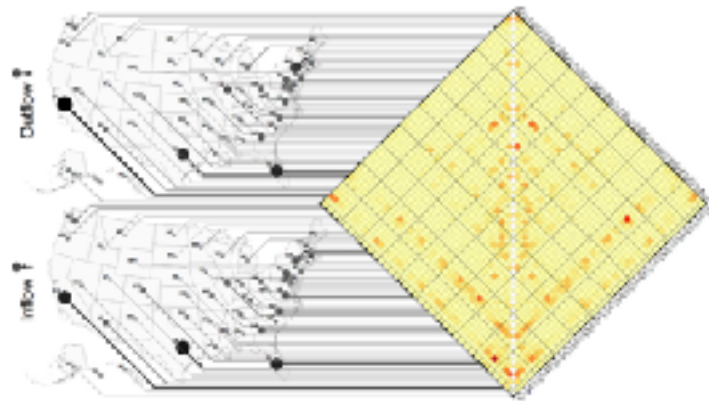
- 1.Have a discussion with our group members. Report our work of last week. Decide what we need to do this week and discuss about how we are going to do it.
- 2.Revise coding bugs of our system.

Others

- 1.Survey on the topic of anomaly detection and evaluation. (read related paper)
- 2.Review the Eurovis paper.

Paper Reading

1. Many-to-Many Geographically-Embedded Flow Visualisation: An Evaluation

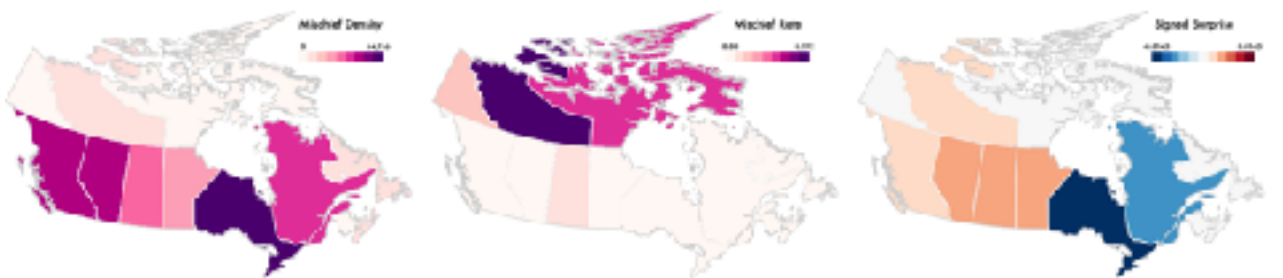


This is an infovis evaluation paper. It introduced MapTriX to visualize many-to-many flows by connecting an OD matrix with origin and destination maps. The entire evaluation of this paper contains two stages.

- 1.They compared MapTriX with a flow map with bundled edges and with OD Maps for different country maps and found MapTriX and OD Maps were far better. But there was no statistically significant difference between MapTriX and OD Maps on big data sets.
2. So they next compared MapTriX and OD Maps on two larger data sets. But they didn't find that one method outperformed the other.

It is actually my first time to study an evaluation paper. The evaluation process in this paper is worth studying.

2. Surprise! Bayesian Weighting for De-Biasing Thematic Maps



It is the second time I read this paper and this time more carefully. They presented the bayesian surprise method to tell wether the result of a certain model is reliable. They

- (1) construct a model space M ,
- (2) generate an initial set of prior beliefs about models $P(M \in M)$
- (3) collect data D and perform a Bayesian update step to generate $P(M|D)$ given $P(D|M)$. Bayesian surprise is then the measure of difference between the prior and posterior probabilities of each model for some distance function δ : $\text{Surprise} = \delta(P(M|D), P(M))$. In this paper, they uses Kullback-Leibler divergence.

They give some user studies to argue this method is well designed but no convincing statistical results are presented.

3. EVA: Visual Analytics to Identify Fraudulent Events



This is the eurovis to be reviewed paper. They introduced their approach in collaboration with target users to improve the currently used FFD methodology. They mainly uses a parallel

coordinate view to show the automated computed anomaly score of transactions and emphasize the interactive multiple coordinated views of their system. The topic of this paper is new and interesting in anomaly detection area but their method is quite rough and seems not well prepared. I can't even recognize the contribution they presented in their paper.

4.True IOMMU Protection from DMA Attacks: When Copy Is Faster Than Zero Copy

This is the paper I read for the computer architecture course. Their presented new usage model restricts device access to a set of shadow DMA buffers that are never unmapped, and it copies DMAed data to/from these buffers, thus providing sub-page protection while eliminating the aforementioned vulnerability window. Their key insight is that the cost of interacting with, and synchronizing access to the slow IOMMU hardware.

5.Latency-Tolerant Software Distributed Shared Memory

This is the paper I read for the operating system course. They present Grappa targeted on software distributed shared memory (DSM) for in-memory data-intensive applications. It enables users to program a cluster as if it were a single, large, non-uniform memory access (NUMA) machine. This work borrows the core insight of those hardware systems and builds it into a software runtime tuned to extract performance from commodity processors, memory systems and networks.

To Do

1. Keep up with the security project, including surveying on research topics and do coding jobs.
2. Surveying on the newly discovered idea from the security project(talk to other people, read related papers).
3. Do seminar homework and thesis, prepare for the exams.